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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/015,603 | 12/17/2001 | Laure Monconduit-Jegou | 004900-209 | 4768 |

7590 07/22/2004

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| EXAMINER |
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ALEJANDRO, RAYMOND

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| ART UNIT | PAPER NUMBER |
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1745

DATE MAILED: 07/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|-------------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/015,603 | MONCONDUIT-JEGOU ET AL. | |
| | Examiner | Art Unit | |
| | Raymond Alejandro | 1745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,16,18,19 and 21-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,16,18,19 and 21-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/28/04 has been entered.

This submission is responsive to the foregoing RCE. The applicants have overcome the 112 rejection and the 35 USC 103 rejections. Refer to the aforementioned communication for further details on applicant's rebuttal arguments. However, the claims (including newly submitted claims 22-23) are rejected again over new art for the reasons of record.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 3-5, 16, 18-19 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakura 2002/0015890 in view of Maeda et al 2003/0113626, and further in view of Olego et al 5247349.

The instant application is directed to an electrode and battery wherein the disclosed inventive concept comprises the specific electrode material.

With respect to claims 1, 16, 19:

Nakura discloses lithium secondary batteries comprising a positive electrode and a negative electrode, an electrolyte (SECTION 0012). It is disclosed that suitable materials as negative electrode active materials are lithium containing metal nitride such as Li_7MnN_4 (SECTION 0006). *Thus, the molar amounts "x", "y" and 4 for N are within the claimed range. It is also noted that the lithium metal nitride material itself does encompass the very pnictide phase of the material.*

As to claims 4-5:

Nakura discloses the use of lithium containing metal nitride such as Li_7MnN_4 (SECTION 0006). *Thus, the molar amount "y", in this instance, is 1.0.*

Nakura disclose an electrode material in lithium secondary batteries according to the foregoing. However, Nakura does not expressly disclose the specific element M belonging to the group IVa-Va of the periodic table in the formula.

Maeda et al disclose lithium secondary batteries using as active material for negative electrodes lithium nitride metal compounds represented by the formula $\text{Li}_x\text{M}_y\text{N}_z$ wherein Li is

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lithium atom, M is metal, preferably at least one selected from Mn, Ti and V among others, and N is nitrogen (SECTION 0060).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to employ the specific element M belonging to the group IVa-Va of the periodic table of Maeda et al in the electrode containing a lithium metal nitride of Nakura et al as Maeda et al disclose that, at least, Ti and V, are suitable metals for inclusion in lithium nitride metal compounds. Accordingly, such lithium nitride metal compounds containing Ti or V provides an electrochemical active material appropriate for use in lithium secondary batteries because these compounds are capable of absorbing and desorbing lithium. *Furthermore, since Maeda et al do suggest the interchangeably use of Mn, Ti and V as well as their equivalency for substitution purposes in lithium nitride metal compounds, Maeda et al's teachings are found to be relevant and within the same field of endeavor.*

In addition, neither Nakura et al nor Maeda et al disclose the specific pnictogene element.

Olego et al disclose pnictide materials which are commonly called intermetallic compounds wherein by pnictide it is meant those elements from column V of the periodic table, namely nitrogen, phosphorus, arsenic or antimony (COL 9, lines 10-23/ ABSTRACT).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific pnictogene element of Olego et al in the electrode material of both Nakura et al and Maeda et al as Olego et al disclose that by pnictide it is meant those elements such as nitrogen, phosphorus, arsenic, and antimony; and such pnictide materials reduces the density of surface states, and allows the depletion surface to be modulated, the surface barrier reduced, and the electrode concentration at the surface increased. *Thus, Olego et*

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al directly teach the use of the specific pnictogene elements as instantly claimed. In this regard, it is noted that the three references are found to be pertinent to each other as they all address the same problem of providing suitable pnictide phase materials for electrical applications regardless of the identifiable electrical devices. In addition, Olego et al is employed to simply present the interchangeably use and unrestricted substitution of pnictogene elements such as nitrogen, phosphorus, arsenic, antimony in pnictide phase materials. In this manner, the examiner impartially remarks that the cited references solve the same problem, and thus, they all are reasonably relevant to the particular problem with which the inventor is concerned.

4. Claims 1, 3-5, 16, 18-19 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al 2003/0113626 and further in view of Nakura 2002/0015890, and further in view of Olego et al 5247349.

The instant application is directed to an electrode and battery wherein the disclosed inventive concept comprises the specific electrode material.

As to claims 1, 16 and 19:

Maeda et al disclose lithium secondary batteries comprising a positive electrode, a negative electrode and an electrolyte (SECTION 0071-0072) wherein the active material for the negative electrode can be lithium nitride metal compounds represented by the formula $\text{Li}_x\text{M}_y\text{N}_z$ wherein Li is lithium atom, M is metal, preferably at least one selected from Ti, V and Mn, among other elements, and N is nitrogen; wherein $1.0 \leq x \leq 7.0$, $0 \leq y \leq 4.0$ and $0.5 \leq z \leq 5.0$ (SECTION 0060). *It is noted that the lithium metal nitride material itself does encompass the very pnictide phase of the material.*

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As to claims 3, 18 and 21:

Maeda et al disclose that the metal element M is selected from Ti, V and Mn, among other elements (SECTION 0060).

Maeda et al disclose a negative electrode for lithium secondary batteries according to the foregoing. However, Maeda et al does not expressly disclose the specific molar amounts within the claimed range.

With respect to claims 1, 16, 19:

Nakura discloses a lithium secondary battery comprising a positive electrode and a negative electrode, an electrolyte (SECTION 0012). It is disclosed that suitable materials as negative electrode active materials are lithium containing metal nitride such as Li_7MnN_4 (SECTION 0006). *Thus, the molar amounts "x", "y" and 4 for N are within the claimed range.*

As to claims 4-5:

Nakura discloses the use of lithium containing metal nitride such as Li_7MnN_4 (SECTION 0006). *Thus, the molar amount "y", in this instance, is 1.0.*

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific molar amounts within the claimed range of Nakura et al in the electrode containing a lithium metal nitride of Maeda et al because Nakura et al teach that this lithium metal nitride material having the claimed molar amounts are being currently used as negative electrode active materials because it is capable of absorbing and desorbing lithium in lithium secondary batteries, thus, serving as an alternative to other lithium metal materials. Accordingly, lithium batteries using the instant lithium metal nitride as a negative electrode active material has superior reliability and an extended cycle life. *Furthermore, since Maeda et*

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al do suggest the interchangeably use of Mn, Ti and V as well as their equivalency for substitution purposes in lithium nitride metal compounds, Nakura et al's teachings are found to be relevant and within the same field of endeavor.

In addition, neither Maeda et al nor Nakura et al disclose the specific pnictogene element.

Olego et al disclose pnictide materials which are commonly called intermetallic compounds wherein by pnictide it is meant those elements from column V of the periodic table, namely nitrogen, phosphorus, arsenic or antimony (COL 9, lines 10-23/ ABSTRACT).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific pnictogene element of Olego et al in the electrode material of both Maeda et al and Nakura et al because Olego et al disclose that by pnictide it is meant those elements such as nitrogen, phosphorus, arsenic, and antimony; and such pnictide materials reduces the density of surface states, and allows the depletion surface to be modulated, the surface barrier reduced, and the electrode concentration at the surface increased. *Thus, Olego et al directly teach the use of the specific pnictogene elements as instantly claimed. In this regard, it is noted that the three references are found to be pertinent to each other as they all address the same problem of providing suitable pnictide phase materials for electrical applications regardless of the identifiable electrical devices. In addition, Olego et al is employed to simply present the interchangeably use and unrestricted substitution of pnictogene elements such as nitrogen, phosphorus, arsenic, antimony in pnictide phase materials. In this manner, the examiner impartially remarks that the cited references solve the same problem, and thus, they all are reasonably relevant to the particular problem with which the inventor is concerned.*

Response to Arguments

5. Applicant's arguments, see the amendment filed on 06/28/04 for specific details, with respect to the rejections of claims 1, 3-5, 16, 18-19 and 21 have been fully considered and are persuasive. Therefore, the rejection has been overcome. However, upon further consideration, new grounds of rejection is made as seen above. Accordingly, applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro
Examiner
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